

## Description of Additional Supplementary Files

**Supplementary Movie 1:** Demonstration of the opposite charge curve and secondary start-up for ECE-TENG.

**Supplementary Movie 2:** Demonstration of charge density curve with voltage stabilization for ECE-TENG.

**Supplementary Movie 3:** Demonstration of the opposite charge curve and reverse circuit for SCE-TENG.

**Supplementary Movie 4:** Demonstration of charge density curve with voltage stabilization for SCE-TENG.

**Supplementary Movie 5:** Demonstration of lighting white and green LEDs for charge excitation TENG.

**Supplementary Movie 6:** Demonstration of charging 1 $\mu$ F capacitor for charge excitation TENG.